

DOCUMENT INFORMATION

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Data product specification document for *zone* geographical component

Working draft 4.1 – April 2024

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Introduction

The purpose of this document is to provide the data product specifications for the geographic component of zones defined according to the chapter 4.4 “Zoning and compartmentalisation” of the WOAH Terrestrial Code.

Specifically, this document consists on precise technical requirements that should be fulfilled to represent a *zone* from the geographical point of view. In particular, it includes general information for zone characterisation as well as information on data content and structure, reference systems, data quality aspects, data capture, maintenance, delivery and metadata.

The content and structure of this document are consistent with the international standards for data product specifications “ISO 19131:2007/Amd. 1:2011(E) Geographic information – Data product specification”.

1. Overview

1.1. Title

Data product specification document for the *zone* geographical component.

1.2. Informal description of the data product

According to the WOAH Terrestrial Code – Chapter 4.4 “Zoning and compartmentalisation”, a *zone* is *a part of a country defined by the Veterinary Authority, containing an animal population or subpopulation, with a specific animal health status with respect to an infection or infestation for the purposes of international trade or disease prevention or control*¹. *The extent of a zone and its geographical limits should be established by the Veterinary Authority on the basis of natural, artificial or legal boundaries, and made public through official channels (Article 4.4.3. paragraph 1)*. In order to ensure that the precise meaning of a zone geospatial data defined according to chapter 4.4 of the WOAH Terrestrial Code is understood and preserved by stakeholders and users, a data product specification for zone has been defined.

This data product specification has been produced by a network of WOAH Collaborating Centre with the purpose of establishing a standardized geometric description and a comprehensive set of zone attributes. The objective was to define the requirements for exchanging datasets of zones as defined in chapter 4.4 of WOAH *Terrestrial Code* for sharing between WOAH Members and the WOAH headquarters. The data model can and should be extend beyond the requirements set by the network.

1.3. Terms and definitions

Accuracy - closeness between the result of a test or measurement and the true value [ref.: ISO 19157]. Accuracy usually takes the form of an error estimate such as standard error (standard deviation of the errors) and is distinguished from precision, which relates to the quality of the operation by which the result is obtained.

Attribute - a property of an entity; for example, the colour of a building, the width of a road. Attributes are either quantitative or qualitative.

Application schema – an application schema provides a description of the semantic structure of the dataset identifying the spatial object types and the reference systems required for a complete description of the geographic information [ref.: ISO 19109].

Coordinate reference system - coordinate system that is related to an object by a datum. For geodetic and

¹ Reference: WOAH glossary - https://www.WOAH.int/fileadmin/Home/eng/Health_standards/tahc/2018/en_glossaire.htm. Accessed 15 April 2024

vertical datum it will be related to the Earth [ref.: ISO 19111].

Data - a representation of facts, concepts, or instructions in a formalized manner suitable for communication, interpretation, or processing by humans or by automated means.

Data format - a specification that defines the order in which data is stored, or a description of the way data is held in a file or record.

Data model – an abstraction of the real world that incorporates only the properties deemed relevant to the application at hand. The data model would normally define specific groups of entities, and their attributes and the relationships between these entities. A data model is independent from a computer system and its associated data structure. A map is one example of an analogue data model [ref.: ISO/TC211 ISO 19109].

Data structure - in the context of data model, the formal organization of data elements, their attributes and spatial position. The physical structure used to represent the data model.

Data product specification – a data product specification is a detailed description of a dataset or dataset series together with additional information that will enable it to be created, supplied to and used by another party. It forms the basis for producing or acquiring data. It also may help potential users to evaluate the data product to determine its fitness for use by them [ref.: ISO 19131].

Data schema – formal description of a data model [ref.: ISO 19109].

Dataset - an identifiable collection of data.

Domain – a territory over which rule or control is exercised. A sphere of activity, concern, or function [ref.: ISO 19103].

Entity – a real-world feature that is of interest; something about which data is stored.

Exchange (data): data exchange is the process of sending and receiving data in such a manner that the information content or meaning assigned to the received data is an accurate representation of the source data.

Feature – abstraction of real world phenomena. It is the starting point for modelling of geographic information and a digital representation of a real world entity or an abstraction of the real world. It has a spatial domain, a temporal domain, or a spatial/temporal domain as one of its attributes. Examples of features include almost anything that can be placed in time and space, including desks, buildings, cities, trees, forest stands, ecosystems, delivery vehicles, snow removal routes, oil wells, oil pipelines, oil spill, and so on. Features are usually managed in groups as feature collections. The terms feature and object are often used synonymously [ref. ISO 19101].

Feature type – a class that specifies sets of spatial objects with common properties and operations applicable to the objects [ref.: ISO 19156].

Feature attribute – characteristic of a feature. NOTE: A feature attribute has a name, a data type and a value domain associated to it [ref. ISO 19101].

Geospatial data - is an information that describes objects, events or other features with a location on the surface of the earth. Geospatial data typically combines location information (usually coordinates on the earth) and attribute information (the characteristics of the object, event or phenomena concerned) with temporal information (the time or life span at which the location and attributes exist).

Item - anything that can be described and considered separately. An item can be a part of a dataset, such as a feature, feature relationship, feature attribute or combination of these [ref.: ISO 19157].

Metadata - information about a resource [ref.: ISO 19115-1].

Object - the physical representation of a feature entity corresponding to a feature and associated attributes.

Portrayal - presentation of information to humans [ref.: ISO 19117].

Quality - totality of characteristics of a product that bear on its ability to satisfy stated and implied needs [ref.: ISO 19101].

Schema matching = data matching = schema matching is the process of identifying that two objects are semantically related in order to find the possible method/process/software for the transformations between the objects.

Semantic - the semantic aspect refers to the meaning of data elements and the relationship between them. It includes developing vocabularies and schemata to describe data exchanges, and ensures that data elements are understood in the same way by all communicating parties.

Syntactic - the syntactic aspect refers to describing the exact format of the information to be exchanged in terms of grammar and format.

Service – a computation performed by a software entity on one side of an interface in response to a request made by a software entity on the other side of the interface. A collection of operations, accessible through an interface that allows a user to evoke behaviour of value to the user [ref.: ISO 19119].

Spatial object – an abstract representation of a real-world phenomenon related to a specific location or geographical area.

Standard – A standard is a documentation established by consensus and approved by an accredited standards body nationally or internationally recognized by industrial, professional, trade, or governmental organizations. Standards reflect agreements on products, production method, terminology, practices, services [ref.: ISO/IEC Guide 2:2004, ISO/TS 19159-1].

Transfer (data): transfer refer to the exchange of any information that is transferred from one location to another through some communication method. Data transfer is most often used to share data among business partners, suppliers, or government agencies for cooperative purposes.

Unified Modelling Language (UML) – an open modelling standard for conceptual schema language defined and maintained by the Object Management Group [ref.: ISO .24622-1].

Universe of discourse – view of the real or hypothetical world that includes everything of interest [ref.: ISO 19101.].

Use case scenario - a possible sequence of real world events used as a test case for specifying or testing information systems designed to help manage such events [ref.: ISO 20077-1].

1.4. International standards

WOAH international standards (Chapter 4.4.)– WOAH Terrestrial Animal Health Code (2024)

ISO 19101: Geographic information — Reference model -- Part 1: Fundamentals

ISO 19103: Geographic information — Conceptual schema language

ISO 19106: Geographic information — Profiles

ISO 19107: Geographic information — Spatial schema

ISO 19108: Geographic information — Temporal schema

ISO 19109: Geographic information — Rules for application schema

ISO 19110: Geographic information — Methodology for feature cataloguing

ISO 19111: Geographic information — Referencing by coordinates

ISO 19115: Geographic information — Metadata -- Part 1: Fundamentals

ISO 19117: Geographic information — Portrayal

ISO 19125-1: Geographic information — Simple feature access — Part 1: Common architecture

ISO 19131: Geographic information — Data product specifications

ISO 19157: Geographic information — Data quality

1.5. Acronyms and abbreviations

<i>Zone</i> (in <i>italic</i>)	zone defined according to the WOAH zoning procedure as described in chapter 4.4 of the Terrestrial Code
GeoZone	data product specifications for the geographic information related to the <i>zone</i>
ISO	International Organisation for Standardisation
UML	Unified Modelling Language
GI	Geographic Information
GIS	Geographic Information System
IT	Information and Communications Technology
WOAH	World Organisation for Animal Health

1.6. Data Product Specification - Metadata

Title	Zone geospatial data
Identifier	4.1
Date	15.04.2024
Language	English
Contact	Istituto Zooprofilattico Sperimentale delle Venezie Viale dell'Università,10 35020 Legnaro (PD), Italy https://www.izsvenezie.it/ gis@izsvenezie.it
Maintenance	The product specification is maintained by Istituto Zooprofilattico Sperimentale delle Venezie

1.7. Disclaimer

The views expressed in this document are those of the authors and do not necessarily reflect the views or policies of WOAH.

2. Specification scope

GeoZone aims to enable exchange of *zone* geospatial data among national and international systems and GIS users.

The rules defined in this specification ensure transparency and methodological coherence for the creation, verification and exchange of *zone* geospatial data.

2.1. In scope

GeoZone provides a set of specifications to assist WOAHA Members in the semantic and syntactic definition of *zone* attributes and in providing an encoding solution to enable the exchange of *zone* geospatial data between Members (e.g. bilateral recognition of country or zone status by trading countries. Reference Article 4.4.8.) and to and from a WOAHA information system².

2.2. Field of application

Zone geospatial data organised according to the GeoZone specifications can be used in GIS applications for inventory³ and visual explorative spatial analysis⁴ purposes.

2.3. Out of scope

The specification of information that is not relevant to the geographical characterization of a *zone* is it is out of GeoZone's scope. In particular, GeoZone is not designed to acquire and manage detailed information about disease response, biosecurity plans, surveillance procedures⁵, animal traceability or any other activity performed by the Veterinary Authority within a *zone*.

This data product specification does not specify the production process, but only the resulting data product. Nevertheless, it includes maintenance aspects necessary to describe the dataset exchange among WOAHA Members and to and from a WOAHA information system.

2.4. Modelling assumptions

The data model proposed in this specification is the outcome of analysing a set of use cases that were defined within a network of WOAHA Collaborating Centres. The use cases are presented in Annex F – Use cases.

2.4.1. Zone characterisation

A *zone* is characterised by an area, a designation period, the concerned animal disease, and the type of zone established (e.g.: free zone, infected zone).

2.4.2. Operational requirement

² A WOAHA information system to manage zone geospatial data is not present at the time this document was prepared, however, according to the use cases developed during the preparatory phase of this document, it is envisaged that a centralized system dedicated to collect, integrate and publish *zone* geospatial data is present.

³ GIS inventory is essentially a catalogue of geospatial data. Its primary purpose is to track the availability and the status of collected spatial data. A GIS inventory for the zones geographical component (i) provides spatial and non-spatial information about zones, (ii) enables the representation, through choropleth maps, of the spatial distribution of zones according to the defined zone's characteristics (e.g.: disease, type of zone, etc.), and (iii) enhances the improvement of the accuracy and of the organisation of the stored *zone* data.

⁴ The visual explorative spatial analysis of zone spatial data enables the evaluation of the spatial and temporal evolution of zones, either as a preliminary step toward the study of spatial patterns of zones and for identifying global trends and local outliers.

⁵ All regular activities aimed at ascertaining the health status of a given population with the aim of early detection and control of animal diseases of importance to national economies, food security and trade.

1. This standard has been produced with the assumption that each Member uses different hardware, software and data structure to manage *zone* geospatial data, including different coordinate reference systems (sometimes more than one in each Member), languages and character sets.
2. Member manages *zone* geospatial data to meet national and international requirements.
3. Correspondences between Member's existing *zone* geospatial data and the data structure defined in this specification can be established by various tools of data matching (e.g. data mining, formal specifications) and transformations (e.g. generalisation, matching geometries).
4. Geographic staff involved in the development of *zone* geospatial data are encouraged to recognize the benefits of aligning their data structures, feature coding schemes and attribute coding schemes with these specifications.
5. This standard has been optimised to facilitate the transfer of zones datasets.

2.4.3. Logical consistency

Logical consistency deals with logical rules of structure and attributes for spatial data and describes the compatibility between dataset items. In this data product specification, the definition of the spatial data integrity rules is provided as free text in the natural language in order to improve the readability of the rules.

The data integrity rules are classified in 4 classes: (I) operation, (II) spatial relationship, (III) temporal integrity, (IV) attribute data integrity.

2.4.3.1. Operation.

Operational class is defined to express specific actions for geographic data. Operations are given as follows:

- New zone. This operation refers to the creation of a geospatial data for a zone different (in coverage and/or attribute values) from existing zones established by a Member.
- Update the geometry of an existing zone. This operation implies the closing of the existing *zone* by setting the "end date" value and the creation of a new *zone*.
- Update the attributes of an existing zone. This operation implies the closing of the existing *zone* by setting the "end date" value and the creation of a new *zone*.
- Close an existing zone. To set the "end date" value to the attribute "zone date validity" of an existing *zone*.
- Amend incorrect data. This operation implies replacing the existing *zone* values with the correct one.
- Remove a wrong zone. This operation implies the cancellation of the feature from the dataset.

2.4.3.2. Spatial relationship.

Spatial relationships are used to describe the state between two spatial objects. The spatial relationships are given as follows:

- Within. *Zones* must be within the country boundary that established the *zone*.
- Equal. Two active *zones* can have the same geometry only if the disease and/or the zone type values are different.
- Overlaps or contains. The description of overlaps or contains spatial relationship will be established according to the pilot outcomes.

2.4.3.3. Temporal integrity.

The "end date" value of an existing *zone* must be greater than the "begin date" value.

2.4.3.4. Attribute data integrity.

All the mandatory attributes must have a valid value.

3. Data content and structure

3.1. Description

A single spatial type of object called «ZoneGeospatialData» has been defined to spatially represent the *zone*. ZoneGeospatialData contains the following⁶:

- 3.1.1. **Geometry [M]**: the geometry represents the spatial extent of ZoneGeospatialData. The geometry shall be represented as multiple polygons⁷. A Multiple polygon corresponds to a collection of polygons. A polygon is defined as “a simple planar surface with one exterior boundary and none or more interior boundaries. Each interior boundary represents a hole in the polygon”⁸.

The assertions for the geometry property (the rules that define valid *zone*) are as follows:

- 3.1.1.1. A *zone* can be composed of one or more polygons.
 3.1.1.2. The polygon/s boundary/ies represent(s) the *zone* limit.
 3.1.1.3. The polygon boundary can be created with multiple segments or as a result of a buffer function.
 3.1.1.4. A *zone* may coincide with one or more administrative boundaries.
 3.1.1.5. Examples of valid geometry are presented in the following figure:

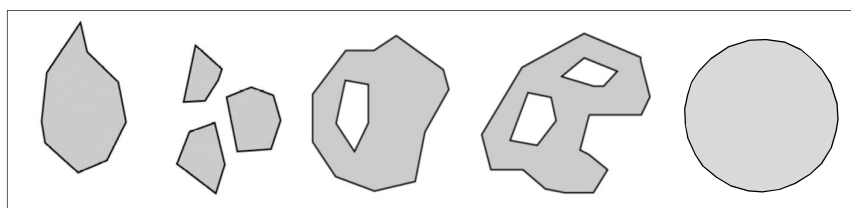


Figure 1. Examples of geometric objects representable as instances of MultiPolygons

- 3.1.2. **Accuracy [M]**: for some data provider and for some zone types (e.g. infected zones) it is required to ensure confidentiality on zone geographical limits. Therefore it is allowed to represent not exact zone boundaries. This attribute is used to inform whether the zone boundaries are “accurate” (following the zone boundaries exactly) or “inaccurate” (not being in agreement with real zone boundaries).
- 3.1.3. **Zone type [M]**: it provides the classification of the *zone* according to the definition included in the WOAH Terrestrial Code. In particular, this property refers to the type of *zones* described in articles 4.4.4 (Free zone), 4.4.5 (Infected zone), 4.4.6 (Protection zone), and 4.4.7 (Containment zone) of the WOAH Terrestrial Code. However, other types of *zones* may be established by Members for the purposes of disease control and/or trade. For this reason, the zone type list shall be an extensible WOAH-governed code list⁹. The intention to allow the zone type code list

⁶ “M” indicates that the element is mandatory; an “O” indicates that the element is optional.

⁷ Multiple polygon (MultiPolygon) is the instantiable subclass of MultiSurface whose elements are Polygons. MultiSurface is introduced as abstract/non-instantiable superclass in clause 6.1.12 of ISO 19125 Geographic information — Simple feature access — Part 1: Common architecture

⁸ Reference: Geographic information – Simple feature access – Part 1: Common architecture; Clause 6.1.13

⁹ Code lists are used extensively in the GeoZone data models. All GeoZone code lists are governed by WOAH (i.e. store, managed and updated by WOAH). They can be classified according to their extensibility:

- not extensible (none)
- extensible with narrower values (narrower).

to be extensible is to enable Members' ability to propose any dataset they identify that falls within the scope of the chapter 4.4 of the WOAH Terrestrial Code.

- 3.1.4. **Zone Subtype** [O]: this allows more specific classification of the zone (e.g.: negligible risk zone, controlled risk zone for BSE free zone). The zone subtype list shall be an extensible WOAH-governed code list.
- 3.1.5. **Zone Status** [O]: This attribute is used only for free zone and for AHS, BSE, CSF, CBPP, FMD and PPR diseases. It specifies whether the free zone is at proposed status, or officially recognised by WOAH.
- 3.1.6. **Disease** [M]: a disease is at the basis of the decision to establish the *zone*. The diseases list shall be a WOAH-governed code list¹⁰.
- 3.1.7. **Species** [M]: list of species considered in the zone. It refer to the concept of "animal subpopulation¹¹" defined in Chapter 4.4 (i.e. avian, bees, bovine, equine, lagomorph, sheep and goats, swine, other animals, wild animals).
- 3.1.8. **Designation period** [M]: the time when the *zone* is legally designated or become effective. The designation period requires a *start* and an *end* date.

The assertions for the designation period property (the rules that define valid *zone*) are as follows:

- 3.1.6.1. The "start" date shall be defined (i.e. a date is provided) from the beginning (i.e. when the *zone* is established).
- 3.1.6.2. Usually, when a *zone* is established, it does not have a value for the "end" date. An "indeterminate position" value shall be used in the "end" date to state that the *zone* is still effective.
- 3.1.6.3. The designation period information shall be used to represent the status of a *zone* (e.g. ongoing, closed).
- 3.1.9. **Control measures** [M]: measures are implemented within the *zone*. The list of measures shall be defined in accordance with the relevant disease-specific chapter of the WOAH Terrestrial Code.
- 3.1.10. **Local identifier** [M]: a local identifier, assigned by the data provider. This is not a unique spatial object identifier. The local identifier shall not be changed during the life-cycle of the *zone* geospatial data.
- 3.1.11. **Country** [M]: name of the Member and non-Members which established the *zone*. The countries list shall be a WOAH-governed code list.
- 3.1.12. **Geographical names** [O]: geographical name is used to identify the zone in the real world. It provides a 'key' for implicitly associating different representations of the object. In case the *zone* coincides with one or more administrative boundaries, this attribute can be used to provide the list of administrative units' names.

3.2. UML overview

¹⁰ The WOAH Terrestrial Code - Chapter 1.3 – Diseases, Infections and Infestations listed by the WOAH. Can be used as reference for the disease list definition.

¹¹ Subpopulation: means a distinct part of a population identifiable in accordance with specific common animal health characteristics. [reference: https://www.woah.org/en/what-we-do/standards/codes-and-manuals/terrestrial-code-online-access/?id=169&L=1&htmlfile=glossaire.htm#terme_sous_population]

The application schemas included in this section are specified in UML version 2.3 class diagrams.

3.2.1. Stereotypes

Above the name of classes in the application schema of figure 2, there is a stereotype name in quotes. Stereotypes are used to extend the basic UML elements and give them different meanings. In the ZoneGeospatialData application schema four types of stereotypes are used:

- **FeatureType**: represents geographic object types. It is an XML element whose XML Schema-type is derived from gml:AbstractFeatureType (ISO 19136);
- **DataType**: XML element with a complex content model;
- **Abstract**: an abstract class is a class used as a basis for creating specific objects that conform to its protocol, or the set of operations it supports. Abstract classes are not instantiated directly;
- **CodeList**: stereotype that represents an extendable list of possible values.

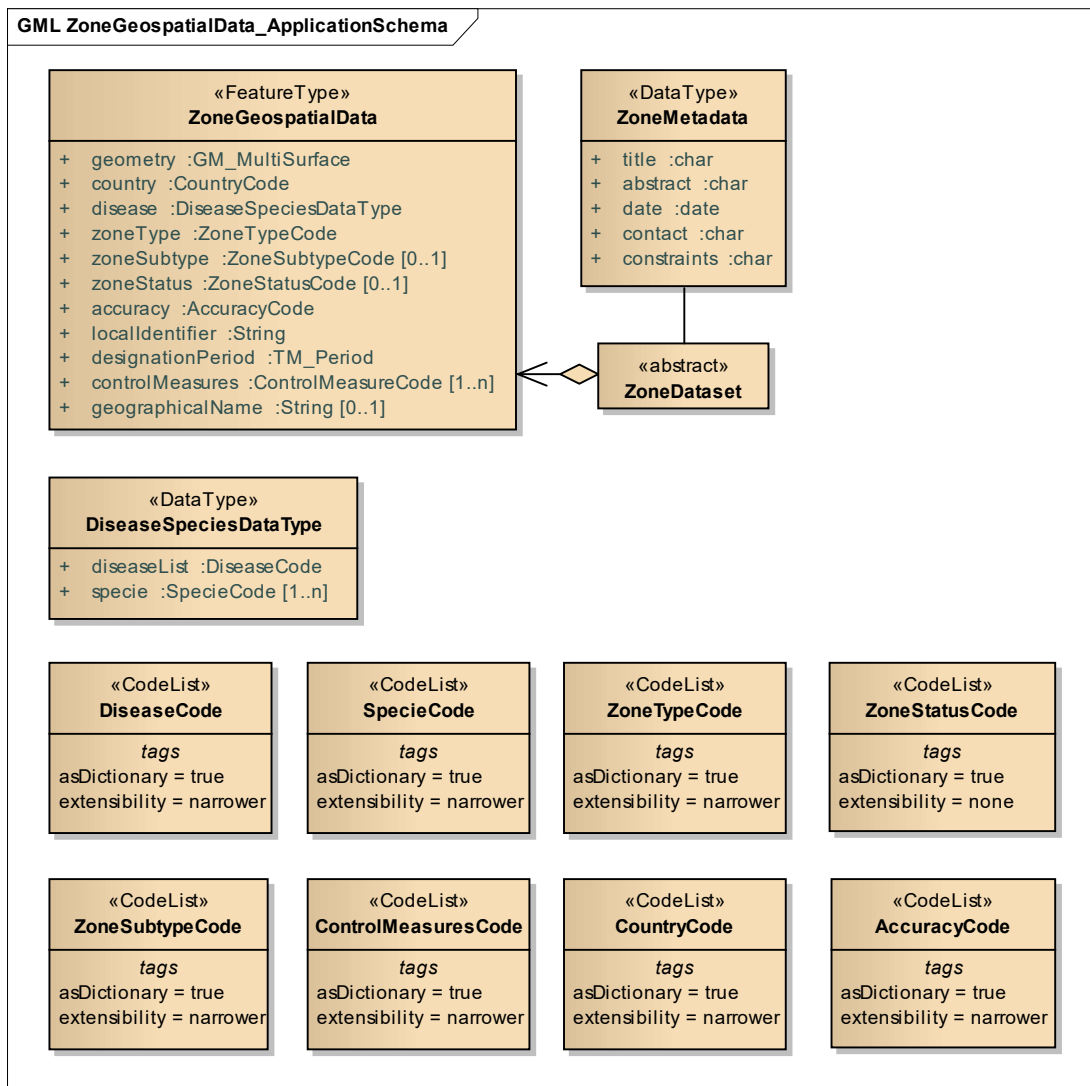


Figure 2. UML class diagram: overview of the zone application schema

3.2.2. Code list

A code list type is a list of valid identifiers of named literal values which may be extended only in conformance with specified rules. These classes will be managed at WOH level.

3.2.3. Language

The language used in the code lists classes is English.

3.2.4. Zone identifier

The GeoZone data specifications do not include a unique object identifier. However, an external unique object identifier, which may be used by external application to reference the spatial object, can be defined by combining the information included in the metadata and the feature class values.

In GeoZone, the external unique object identifier is composed of two parts:

- A namespace to identify the data source (the value in the *namespace* attribute of metadata data type);
- A local identifier assigned by the data provider (the value in *localId* attribute of GeoZone feature type).

A local identifier is assigned by a data provider and is unique within the namespace (i.e., no other spatial object carries the same unique identifier). It is the responsibility of the data provider to guarantee uniqueness of the local identifier within the namespace. The local identifier can use combination of country codes, diseases or other characters.

The namespace defines the data source. It can consist of two parts: the first part identifies the Member Country and the second part is used to distinguish between different data sources maintained and provided by the Member Country.

Local identified	namespace	<i>description</i>
ITA_AI_0001	ITA_VetINFO	<ul style="list-style-type: none"> • the first avian influenza infection zone of 2022. • the namespace is the VetINFO system of Italian Health Ministry
ITA_001	ITA_MinSal	A spatial object from the dataset of the Italian Health Ministry

Table 1. Example of zone identifier structure.

As the local identifier is not the unique external object identifier, and recognizing the need for centralized data management systems to have a unique identifier, Annex E – GeoZone shape file schema, include a specific paragraph describing the characteristics of a possible unique identifier attribute that can be used as a unique worldwide identifier of zone feature records.

3.2.5. Geometry representation

Geometry representation (indicated in the Zoning featureType as GM_Object) refers to the Simple Feature spatial schema as defined in ISO 19107.

This specification restricts the spatial schema to multi polygons (MultiPolygons).

3.2.6. Temporality representation

The designationPeriod uses the TM_Period property following ISO 19108:2006. This property distinguishes the “beginPosition” from the “endPosition”. The “beginPosition” attribute specifies the date when the zone becomes valid, while the “endPosition” attribute specifies the date when the zone ceases to be valid.

The Gregorian calendar is used as temporal reference system, in accordance with ISO 19108.

3.3. Feature catalogue

The feature catalogue elements are presented in Annex A – Feature catalogue.

4. Coordinate reference system

The coordinate reference system used for this product specification is World Geodetic System 1984 (WGS 84) which is defined by the European Petroleum Survey Group (EPSG) code 4326 (<https://epsg.io/4326>).

5. Temporal Reference Systems

The purpose of this data model is to provide a clear and well-defined method for representing dates. Therefore, to avoid misinterpretation in the numeric dates representations, especially during data transfer between Members with different conventions. Therefore, the data shall be organised in a way that the largest temporal term (the year) appears first in the data string, progressing to the smallest term (the second).

Example. 1968-06-27 shall be used to refer to 27th June 1968¹².

6. Data quality

Zone geospatial data is always compiled from the best available sources, and undergoes specific checks by the data producer prior to release. These checks include data format validation, conformance to standards checks and logical consistency checks. Detailed checks are listed in Annex B - Quality measure elements.

The approach to organize information about data quality is based on ISO 19157 Geographic information – Data quality.

7. Data capture

Data providers collect zone geospatial data using their own processes, ensuring necessary transformation to meet the current specifications.

If zones coincides with administrative limits, data providers should refer to the most recent WAHIS GADM geospatial dataset.

To promote information sharing and ensuring confidentiality, mechanisms for providing not exact boundary limits are allowed, including scaling administrative limit¹³, generalisation, and masking.

8. Data maintenance

GeoZone provides a set of specifications to enable the exchange of zone geospatial data. The exchanged dataset should be considered to contain in-force and valid zones until a new dataset is issued by the data provider. The zone data is effective as of the date of submission and contains only valid zones.

Data updates will be made through new editions of exchanged zone dataset. The maintenance and update frequency of the exchanged zone datasets should be defined by the data provider in agreement with the recipient of the datasets.

This data product specification does not specify the zone data management process. Nevertheless, to facilitate the correct use of exchanged of zone data, any zones that need updating from the previous issued dataset (the type of data update is defined in paragraph 2.4.3.5 – Operation class) shall be set as closed, and a new zone should be issued. Using this approach, every dataset is self-contained and allows for data usage without the need to know the previous state of the zone.

If individual instances of features requires updating, maintenance of histories, or change tracking, the methods for update, history management, change tracking and display are left to a centralised application

¹² ref: ISO 19108 clause 5.4.4.1

¹³ Listed the administrative units involved in the zone or use a les finer administrative limit (e.g. province instead of municipality)

or production system. In Annex E – GeoZone shape file schema, a specific paragraph is dedicated to describe a possible solution to manage the data updating process.

9. Portrayal

This clause defines the styles for portraying *zones* based on attributes such as *zoneType*, *ZoneSubType* and *zoneStatus*. Styles for the layer are provided in Annex C – Styles for the main Zones classification values.

10. Data product delivery

Standard encoding will be performed using an XML grammar, defined by an XML Schema in accordance with the data scheme. Geographic data will be serialized using the MultiSurface type of the ISO GML standard, restricted to 2D polygons. The employ of GML is aimed to express geographical features with a common standard, empowering open interexchange of data.

All software services will accept XML data as data source, however, in order to improve data exchange with organisations missing a deep knowledge of geographic data manipulation, alternatives data format, based on ESRI shapefile (SHP) or Well Know Text format (WKT), are possible.

Annex E – GeoZone shape file schema provides a possible implementation of the GeoZone data model into a shape file data format.

11. Metadata

This chapter defines metadata elements for describing the *zone* dataset exchanged. The core metadata elements are listed below: a “M” indicates that the element is mandatory; an “O” indicates that the element is optional.

Table 2. Metadata list of elements

GeoZone implementing rule	Description	Obligation
title	Dataset title. Name by which the dataset is known	M
abstract	Brief narrative summary of the content of the dataset.	O
date	it is the date when the dataset was created	O
namespace	Identification of the information system used to manage the zone. Namespace uniquely identifying the data source of the spatial object. The namespace is owned by the Member Country	M
constraints	Constraints related to access and use of dataset. A list of possible different categories of constraints applicable to the dataset is provided in annex D	O

Annex A – Zone geospatial data feature catalogue

Feature catalogue

Name:	Zone geospatial data Feature Catalogue
Scope:	Zone geospatial data
Version number:	4.0
Version date:	2023-09-29

Feature type: ZoneGeospatialData

Name:	ZoneGeospatialData
Definition:	Area defined by a Veterinary Authority that represents the territorial extent where some specific measures or activities are in place for disease prevention or control and/or international trade purposes.
Attributes	
Name:	Geometry
Value type:	GM_Object
Definition:	The geometry represents the spatial extent of a zone. GM-Object shall be encoded as GM_MultiPolygon.
Multiplicity:	1
Name:	Country
Value type:	CountryCode
Definition:	Country which established the zone.
Multiplicity:	1
Name:	Disease
Value type:	DiseaseCode
Definition:	Information about the disease at the basis of the decision to establish the zone. WOAHP governs the list of terrestrial animal diseases.
Multiplicity:	1
Name:	zoneType
Value type:	ZoneTypeCode
Definition:	It provides the classification of the zone according to the definition included in the WOAHP Terrestrial Code. In particular, this property refers to the type of zones described in articles 4.4 of the WOAHP Terrestrial Code.
Multiplicity:	1
Name:	zoneSubtype
Value type:	ZoneSubtypeCode
Definition:	Additional classification value which further specialises the zone type. NOTE: This value should be derived from a relevant domain-specific controlled vocabulary EXAMPLE: for a Bovine spongiform encephalopathy (BSE) zone, where the zoneType value = "free" could be further classified as either: zoneSubtype = negligibleRisk zoneSubtype = ControlledRisk
Multiplicity:	0..1
Name:	accuracy
Value type:	accuracyCode
Definition:	This attribute is used to inform whether the zone boundaries are "accurate" (following the zone boundaries exactly) or "inaccurate" (not being in agreement with real zone boundaries)

Multiplicity:	1
Name:	ZoneStatus
Value type:	ZoneStatusCode
Definition:	This attribute is used only for free zone. It specifies whether the free zone is at “proposed” status, or is “officially recognised” by WOAH (this is applied for AHS, BSE, CSF, CBPP, FMD and PPR diseased), or if is published as a self-declaration (according to article 1.6.3 of the WOAH Terrestrial Code)
Multiplicity:	1
Name:	designationPeriod
Value type:	TM_Period
Definition:	This information specifies the time when the zone is legally designated or become effective. DesignationPeriod uses the ISO 19108 TM_Period which is comprised of two properties - gml:beginPosition and gml:endPosition. If the zone shall remain in force for an indeterminate period of time then the endPosition/indeterminatePosition="unknown" can be used to state that the zone is still effective.
Multiplicity:	1
Name:	controlMeasures
Value type:	ControlMeasuresCode
Definition:	Measures that are implemented within the zone.
Multiplicity:	1..*
Name:	localIdentifier
Value type:	char
Definition:	Identifier published by the data provider. The local Identifier value cannot be used as unique identifier of the zone spatial object.
Multiplicity:	1
Name:	geographicalName
Value type:	char
Definition:	Geographical name is used to identify the zone in the real world. The geographical name can coincide with the administrative unit(s) limit. If the zone coincides with a geographical unit, the geographicalName value is equal to the administrative unit’s name. If the zone coincides with two or more geographical units, the geographicalName value is the list of administrative unit’s names (comma separated). If the zone coincides with the whole country the geographicalName value is the name of the country.
Multiplicity:	0..*

Data type: Zone dataset Metadata

Name:	ZoneMetadata
Definition:	Contains metadata information about the zone dataset.
Attributes	
Name:	title
Value type:	char
Definition:	Name by which the data set is known by the data provider.
Multiplicity:	1
Name:	abstract
Value type:	char
Definition:	Brief narrative summary of the content of the data set.
Multiplicity:	0..1
Name:	date

Value type:	date
Definition:	Date when the dataset was established
Multiplicity:	0..1
Name:	contact
Value type:	char
Definition:	Identification of, and means of communication with the organisation associated with the dataset. The information about the contact should be aligned with the principles relating to processing of personal data
Multiplicity:	1
Name:	constraint
Value type:	char
Definition:	A list of possible different categories of constraints (separated by a semicolon ";") applicable to the data set
Multiplicity:	0..1

Data type: DiseaseSpecieDataType

Name:	DiseaseSpecieDataType
Definition:	This data type contain the information to specify the disease and the related species.
Attributes	
Name:	diseaseList
Value type:	DiseaseCode
Definition:	Information about the disease at the basis of the decision to establish the zone. WOH governs the list of valid disease values. Chapter 1.3 of the WOH Terrestrial Code can be considered as the basis of the WOH disease list (the valid disease list can be greater than the list mentioned in Chapter 1.3 of the WOH Terrestrial Code).
Multiplicity:	1
Name:	specie
Value type:	SpecieCode
Definition:	List of susceptible animal species populations, domestic or wild, considered in the zone. WOH governs the list of valid specie values
Multiplicity:	1..*

Abstract: ZoneDataset

Name:	ZoneDataset
Definition:	Abstract class used to link the geospatial dataset with the related metadata.

Code list: accuracyCode

Name:	Accuracy code list	
Description:	This code list defines the type of zone's accuracy. It defines the degree of concordance of the zone boundaries represented in the feature respect to the official boundary limits.	
Extensibility:	None	
Values:	<i>label</i>	<i>description</i>
	ACCURATE	The zone follows exactly the boundaries
	INACCURATE	The zone is not being in agreement with the official boundaries. Inaccurate boundary are used when the data provider does not want to share the extent of sensible zones (e.g. infected zones) to third parties.

Code list: ZoneTypeCodeName: **Zone type code list**

Description: This code list defines the types of zones. Four types of zones are already defined by WOA: Free, Infected, Protection, and Containment. Members can establish different types of zones. Therefore, the list is extensible and governed by WOA. The code list is extensible to enable data providers to publish any type of zone they identify that falls within the scope of Chapter 4.4.

Extensibility: Narrower

Values:	<i>label</i>	<i>description</i>
	INFECTED	An infected zone is one in which either an infection or infestation has been confirmed, or that is defined as such in the relevant chapters of the Terrestrial Code (Article 4.4.5.).
	CONTAINMENT	In the event of outbreaks in a country or zone previously free from a disease, a containment zone, may be established to minimise the impact on the rest of the country or zone. A containment zone includes all epidemiologically linked outbreaks and is managed in such a way that commodities for international trade can be shown to have originated from either inside or outside the containment zone (Article 4.4.4.).
	FREE	A free zone is one in which the absence of a specific infection or infestation in an animal population has been demonstrated in accordance with the relevant requirements of the Terrestrial Code (Article 4.4.4.).
	PROTECTION	A protection zone may be established to preserve the animal health status of an animal population in a free country or a free zone by preventing the introduction of a pathogenic agent of a specific infection or infestation from neighbouring countries or zones of different animal health status (Article 4.4.4.).

Code list: ZoneSubtypeCodeName: **Zone subtype code**

Description: Additional classification value that further specialises the type of zone.

Extensibility: Narrower

Values:	<i>label</i>	<i>description</i>
	BSE_NEGLIGIBLE_RISK	Commodities from the cattle population of a country or zone pose a negligible risk of transmitting the BSE agent if the conditions expressed in Article 11.4.3 are met.
	BSE_CONTROLLED_RISK	Commodities from the cattle population of a country or zone pose a controlled risk of transmitting the BSE agent if the conditions expressed in Article 11.4.4 are met.
	BSE_UNDETERMINED_RISK	The cattle population of a country or zone poses an undetermined BSE risk if it cannot be demonstrated that it meets the requirements of another category.

Code list: ZoneStatusCodeName: **Zone status code list**

Description: This code list defines the status of a free zone for the African horse sickness (AHS), bovine spongiform encephalopathy (BSE), classical swine fever (CSF), contagious bovine pleuropneumonia (CBPP), foot and mouth disease (FMD) and peste des petits ruminants (PPR) diseases.

Extensibility: None

Values:	<i>label</i>	<i>description</i>
	OFFICIALLY_RECOGNISED	According to the article 1.6.1 of the WOAHS Terrestrial Code, the country or the zone can be officially recognised by WOAHS for freedom from AHS, CSF, CBPP, FMD and PPR or the risk status with regard to BSE
	OFFICIAL_RECOGNITION_PROPOSED	In the frame of the Standard Operating Procedure, when a Member Country requests official recognition of animal health status for a zone, the geographical boundaries of the proposed zone should be clearly defined. The geospatial data that represent the geographical boundaries of the proposed zone are set to proposed until the zone is officially recognised

Code list: CountryCode

Name: **Country code list**

Definition: The Country code list specifies the name of the WOAHS members which established the zone. The three-letter code (alpha-3) of ISO 316 - Country Codes is used to define the country code

Extensibility: None

Values:	<i>label</i>	<i>description</i>
	AFG	Afghanistan
	ALB	Albania
	DZA	Algeria

Code list: DiseaseCode

Name: **Disease code list**

Definition: The Disease code list specifies the disease at the basis of the decision to establish the zone. This code list shall be totally aligned with a future WOAHS governed disease list.

Extensibility: None

Values:	<i>label</i>	<i>description</i>
	1	Anthrax
	2	Infection with Aujeszky's disease virus
	3	Infection with bluetongue virus

Code list: SpeciesCode

Name: **Specie code list**
 Definition: List of animal subpopulation. It is possible to manage multiple species of animals. This dictionary provides the list of species.
 Extensibility: None

Values:

<i>label</i>	<i>description</i>
1	avian
2	bees
3	bovine
4	equine
5	lagomorph
6	sheep and goats
7	swine
8	other animals
9	wild animals

Code list: ControlMeasuresCode

Name: **Control measures code list**
 Definition: This code list defines the type of measures implemented by members in the zone at the time of its establishment. Different types of measures can be established by members in a zone. The list is extensible to enable members to publish any measure they establish in the zone.
 The list of possible control measure should be derived from the relevant Terrestrial Code articles

Extensibility: Narrower

Values:

<i>label</i>	<i>description</i>	<i>Definition</i>
1	Stamping-out	<p>A policy designed to eliminate an outbreak by carrying out the following under the authority of the Veterinary Authority:</p> <ol style="list-style-type: none"> 1) Killing animals that are affected and those suspected of being affected in the herd or flock and, where appropriate, those in other herds or flocks exposed to infection by direct animal-to-animal contact or indirect contact with the causal pathogenic agent. Animals should be killed in accordance with Chapter 7.6.; 2) Disposing of carcasses and, where relevant, animal products by rendering, burning, burial, or by any other method described in Chapter 4.13.; 3) Cleansing and disinfecting establishments through procedures defined in Chapter 4.14. <p>The measure also includes the depopulation of outbreaks, selective killing of animals within the farm/establishment (e.g. test and cull), and preventive/pre-emptive culling of at-risk animals and/or farms</p>
2	Movement control	Restrictions on the movement of one or more animal species (e.g. standstill, ban on housing) and their

		associated commodities, and on different types of fomites (e.g. people, clothing, vehicles, equipment) (Article 4.19.7.).
3	Biosecurity	<p>To avoid the spread of the pathogenic agent outside the affected establishments or infected zones, strict biosecurity measures should be applied (Article 4.19.9.) (e.g. housing order, netting/fencing, access restriction, disinfection and sanitation, transports, etc.).</p> <p>This item includes both the biosecurity measures adopted at farm-time to prevent the introduction/spread of a specific disease, and the extraordinary measures implemented following the identification of outbreaks</p>
4	Vaccination and treatment	Vaccination as part of an official control programme should be conducted in accordance with Chapter 4.18. Treatment can also be used as part of an official control programme (Article 4.19.10.).
5	Animal Identification	The combination of the identification and registration of an animal individually, with a unique identifier, or collectively by its epidemiological unit or group, with a unique group identifier (Glossary)
6	Animal Traceability	The ability to follow and animal or group of animals during all stages of its life (Glossary)
7	Contact tracing	Trace-back/trace-forward activities to follow the movements of live animals and other commodities, fomites and people, to demonstrate connection between outbreaks and other establishments (Article 4.4.7).
8	Surveillance	<p>The systematic ongoing collection, collation, and analysis of information related to animal health and the timely dissemination of information so that action can be taken (Glossary).</p> <p>The measure includes both the ‘ordinary’ surveillance done in peace-time, and extraordinary activities following the detection of specific pathogens. It also includes specific surveillance for susceptible wildlife species and vectors (Chapter 1.4, 1.5).</p>
9	Awareness campaigns	communication through awareness campaigns targeted at all concerned stakeholders, the media, consumers and the general public

Annex B - Quality measure elements

Data quality elements facilitate the assessment and improvement of how effectively a dataset, created by a data producer, fulfils the criteria outlined in the data product specification over time.

The data producer should apply the criteria listed below during the dataset creation process, including a quality evaluation procedure at the dataset production stage.

The inspection for conformance to data product specification's quality evaluation procedure of a received dataset is not specified in this document.

The table below indicates the identified data quality measures and their applicability in this data product specification¹⁴.


Data quality element and sub element	Description	Example
Excess item	A zone is incorrectly present in the data	<i>Feature with identical attributes and geometry</i>
Missing values	Mandatory attributes have missing value	<i>Information regarding the control measure implemented in the zone is not reported</i>
Logical consistency	This data quality measure requires that all items in the dataset must not be stored in conflict with the spatial relationships rules described in paragraph 2.4.3.2.	<i>A zone is not completely within the country boundaries</i>
Format consistency	Physical structure conflict	<i>Dataset is stored in a wrong file format such as text instead of shapefile or GML.</i>
Invalid slivers	Zone defined according to one or more administrative boundaries create slivers with respect to the WAIHS GADM data	<i>The border of a zone does not align with the borders of the relative WAIHS GADM data</i>


¹⁴ The description of eventually further quality measures will be established according to the pilot outcomes


Annex C – Styles for the main Zones classification values

(Informative)

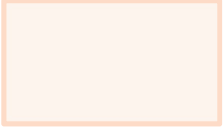
This annex describes various types of layers that are utilized to represent the spatial object types based on the different values:


Style name	Zone.InfectedZone.Default
Spatial object type	zoneType = infectedZone
Abstract	The geometry is rendered with a wine red (#B2182B) fill that has a transparency of 70% along with a solid wine red (#B2182B) outline featuring a stroke width of 2 pixels.
Rule	zonetype = 'INFECTED'
Example	


Style name	Zone.ContainmentZone.Default
Spatial object type	zoneType = ContainmentZone
Abstract	The geometry is rendered with a coral (#EF8A62) fill that has a transparency of 70% along with a solid coral (#EF8A62) outline featuring a stroke width of 2 pixels.
Rule	zonetype = 'CONTAINMENT'
Example	

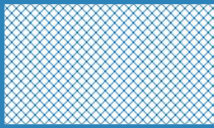
Style name	Zone.FreeZone.Default
Spatial object type	zoneType = FreeZone
Abstract	The geometry is rendered with a patters azureish white blue (#D1E5F0) fill that has a transparency of 70% along with a solid patters azureish white blue (#D1E5F0) outline featuring a stroke width of 2 pixels
Rule	zonetype = 'FREE' AND status IS NULL AND subtype IS NULL
Example	

Style name	Zone.ProtectionZone.Default
Spatial object type	zoneType = ProtectionZone
Abstract	The geometry is rendered with an unbleached silk (#FDDBC7) fill that has a transparency of 70% along with a solid unbleached silk (#FDDBC7) outline featuring a stroke width of 2 pixels.
Rule	zonetype = 'PROTECTION'


Example	
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Style name	Zone.FreeZone.NegligibleRisk
Spatial object type	zoneSubType = NegligibleRiskFreeZone
Abstract	The geometry is rendered with a midnight Blue (#005686) fill that has a transparency of 70% along with a solid blue (#005686) outline featuring a stroke width of 2 pixels.
Rule	zonetype = 'FREE' AND subtype = 'NEGLIGIBLE_RISK' AND disease = 29
Example	


Style name	Zone.FreeZone.Proposed
Spatial object type	zoneStatus = ProposedFreeZone
Abstract	The geometry is depicted using a blue “BDiagonal” texture and is outlined in the same shade of blue (#2B83BA) with a 2-pixel stroke width.
Rule	zonetype = 'FREE' AND status = 'PROPOSED'
Example	


Style name	Zone.FreeZone.OfficiallyRecognised
Spatial object type	zoneStatus = OfficiallyRecognised.FreeZone
Abstract	The geometry is depicted using a blue “Diagonal X” texture and is outlined in the same shade of blue (#2B83BA) with a 2-pixel stroke width.
Rule	zonetype = 'FREE' AND status = 'OFFICIALLY_RECOGNISED' AND (disease = 58 OR disease = 29 OR disease = 63 OR disease = 35 OR disease = 9 OR disease = 44)
Example	

Style name	Zone.ProtectionZone.Proposed
Spatial object type	zoneStatus = ProposedProtectionZone
Abstract	The geometry is rendered with a grey “BDiagonal” texture (#636363) and filled with unbleached silk (#FDDBC7) at 70% transparency. It also features a solid unbleached silk (#FDDBC7) outline with a stroke width of 2 pixels.
Rule	zonetype = 'PROTECTION' AND status = 'PROPOSED'

Example	
----------------	---

Style name	Zone.ProtectionZone.OfficialyRecognised
Spatial object type	zoneStatus = OfficialyRecognised.ProtectionZone
Abstract	The geometry is rendered with a grey “Diagonal X” texture (#636363) and filled with unbleached silk (#FDDBC7) at 70% transparency. It also features a solid patten's unbleached silk (#FDDBC7) outline with a stroke width of 2 pixels.
Rule	zonetype = 'PROTECTION' AND status = 'OFFICIALLY_RECOGNISED' AND (disease = 58 OR disease = 29 OR disease = 63 OR disease = 35 OR disease = 9 OR disease = 44)
Example	

Style name	Zone.FreeZone.ControlledRisk
Spatial object type	zoneSubType = ControlledRiskFreeZone
Abstract	The geometry is rendered with a han blue (#4E6DBD) fill that has a transparency of 70% along with a solid han blue (#4E6DBD) outline featuring a stroke width of 2 pixels.
Rule	zonetype = 'FREE' AND subtype = 'CONTROLLED_RISK' AND disease =29
Example	

Style name	Zone.FreeZone.UndeterminedRisk
Spatial object type	zoneSubType = UndeterminedRiskFreeZone
Abstract	The geometry is rendered with a lapis lazuli blue (#2166AC) fill that has a transparency of 70% along with a lapis lazuli solid blue (#2166AC) outline featuring a stroke width of 2 pixels.
Rule	zonetype = 'FREE' AND subtype = 'UNDETERMINED_RISK' AND disease = 29
Example	

Annex D – Constraints related to dataset access and use

In the metadata class, it is possible to provide restrictions on the access and use of the related dataset. These constraints can be defined based on one or more of the following items:

Constraint	Description	Example
Specific usage	Description of ways in which the resource is used	<i>Used to provide WHOA with an up-to-date status and extent of active free zones throughout the country</i>
Classification code	The resource can be classified as (I) unclassified, (II) restricted, (III) confidential, (IV) secret	<i>Confidential</i>
Use limitation	To provide information on the limitations of the resource usage (i.e. how the resource should not be used)	<i>Should not be used for public consumption</i>
Legal constraint	Restrictions and legal prerequisites for accessing and using the resource	<i>User agreement must be signed before accessing the resource</i>
Access constraint	Constraints are applied to ensure the protection of privacy or to impose any special restrictions or limitations on obtaining the resource	<i>The Resources are subject to the open data and Creative Commons license.</i>

Annex E – GeoZone shape file schema

(Informative)

The shapefile format is a geospatial vector data format developed and regulated by ESRI. It is, by far, the most common geospatial file format. All commercial and open source accept shapefiles; therefore, this annex provides a description of a possible implementation of the GeoZone scheme in shape file format.

GeoZone Shapefile description

SHP attribute name	GeoZone feature catalogue name	Description	Example
countryf	country	Country which established the zone. The three-letter code (alpha-3) of ISO 316 - Country Codes is used define the country code	ITA
disease	disease	Information about the disease that prompted the decision to establish the zone. WOAHA governs the list of terrestrial animal diseases. The value is derived from a disease dictionary code list	1
s_avian	species	Avian	1
s_bee		Bee	1
s_bovine		Bovine	1
s_equine		Equine	1
s_lago		Lagomorph	1
s_sh_go		Sheep and goats	1
s_swine		Swine	1
s_other		Other animals	1
s_wild		Wild	1
zonetype	zoneType	Classification of the zone according to the definition included in the WOAHA Terrestrial Code. Refers to the type of zones described in articles 4.4 of the WOAHA Terrestrial Code. The possible values are: INFECTED, FREE, CONTAINMENT, PROTECTION	PROTECTION
subtype	zoneSubtype	Additional classification value that further specialises the zone type. For a Bovine spongiform encephalopathy (BSE) zone, and for the zoneType value is “free” the possible values are BSE_NEGLIGIBLE_RISK, or BSE_CONTROLLED_RISK, or BSE_UNDETERMINED_RISK	BSE_NEGLIGIBLE_RISK

accuracy	accuracy	Indicates whether the zone boundaries are “accurate” (following the zone boundaries exactly) or “inaccurate” (not agreeing with real zone boundaries)	ACCURATE
status	zoneStatus	Used only for free and protection zones. Specifies whether the zone is at “proposed” status, or is “officially recognised” by WOA (this is applied for AHS, BSE, CSF, CBPP, FMD and PPR diseases)	OFFICIALLY_RECOGNISED
datebegin	designationPeriod	Specifies the time when the zone is legally designated or become effective	25/12/2023
dateend		Specifies the time when the zone is not no longer effective	31/03/2024
m_stmout	controlMeasures	Stamping-out measure	1
m_mov		Movement control measure	1
m_biosec		Biosecurity measure	1
m_vacvrt		Vaccination and treatment measure	1
m_animidm		Animal Identification measure	1
m_antrace		Animal Traceability measure	1
m_ctrace		Contact tracing measure	1
m_surv		Surveillance measure	1
m_aware		Awareness campaigns measure	1
localid	localIdentifier	Identifier published by the data provider. The local Identifier value cannot be used as unique identifier of the zone spatial object	ITA_AI_0001
geoname	geographicalName	Used to identify the zone in the real world. If the zone coincides with a geographical unit, the value is equal to the administrative unit’s name. If the zone coincides with two or more geographical units, the value is a comma-separated list of the administrative unit’s names. If the zone coincides with the whole country, the value is the name of the country	ITALY
uuid		Unique Universal Identifier, a unique identifier attribute that can be used as a unique worldwide identifier of a zone feature record	8D8AC610-566D-4EF0-9C22-186B2A5ED793
optype		Identifies the required operation for a record sent from a Member to the centralised database. Possible operations are Insert, Modify and Delete	INSERT

Operation Type (OPTYPE)

This attribute is used to facilitate the exchange of data with a centralised repository. It defines the operation performed for the zone.

INSERT = the record contains all the data to insert a new zone;

UPDATE = the record contain all the data representing the new version of an existing record. This record must already be present in the centralised database and have to be identify by the uuid;

DELETE= identify the record that is required to be deleted.

Unique Universal Identifier (UUID)

This attribute is used to facilitate the exchange of data with a centralised repository. The attribute contains a unique identifier value generated using a combination of an input string (i.e. localid, countryf, zonetype, and disease) and the current timestamp. The value is constructed by creating an MD5 hash of the concatenated input string and timestamp, then formatting parts of this hash into a UUID-like structure. The resulting uuid string follows the typical UUID4 format with sections of 8, 4, 3, 4, and 12 hexadecimal characters, ensuring a high level of uniqueness for each entry.

Annex E – Use cases

(Informative)

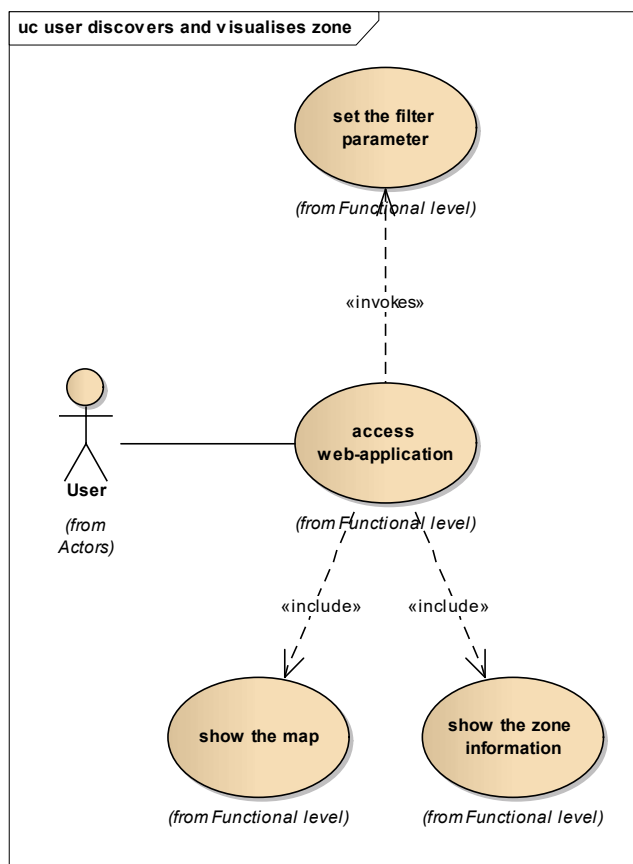
This annex describes the use cases that served as the foundation for the development of requirements analysis. The use cases were developed by a network of WOH Collaborating Centre during the requirements analysis as part of a WOH collaborating project titled “GeoZone - Development of a standard for the collection and sharing of zone geographic component”.

1. User discovers and visualises zones

1.1. User story.

As a user, I want to be able to search for zones of all types by specifying faceted search criteria such as disease and type of zone. I would like to progressively refine my search by adding more criteria. For search results, I would like to view the zone of my interest on a map, along with detailed information describing the specific control/prevention activities and/or regulatory responses implemented in the zone.

1.2: UML use case diagram.



1.3: Use case description table.

ID: 1	
Name	User discovers and visualises zones

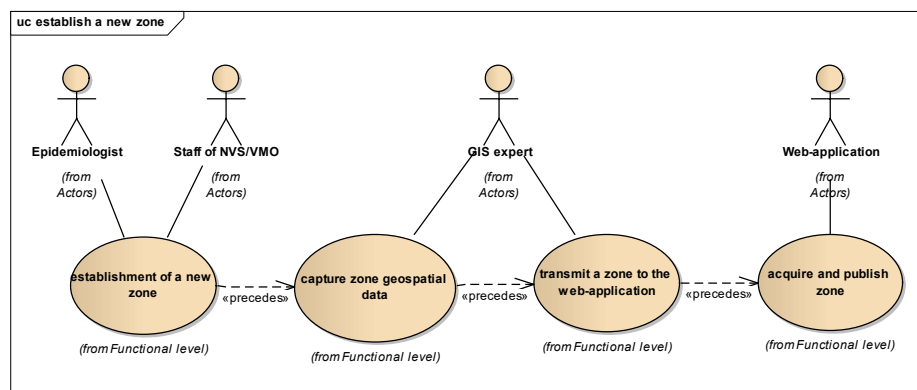
Actor	User: An individual interested in accessing information about various zones
Goal	To discover and visualise zones on a map To gather information regarding the type of control/prevention activities and/or regulatory responses implemented in a specific zone
Level	User
Description	The user aims to gather information about zones. They utilized the web-application to search for a specific zone, visualize it on a meaningful map, and collect information regarding the type of control/prevention activities and/or regulatory responses implemented in the selected zone.
Pre-condition	<ul style="list-style-type: none"> - The web application is online; - The user has the capability to interact with the web-application such as selecting the search criteria and choosing the layers to be displayed on the map; - The web-application and zone data are stored in the English language.
Post-condition	The application displays the map and associates the relevant information with the zone of interest.
Relationship with other use cases	None
Flow of Events – Successful scenario: discovery and display of the information of a zone	
Step 1	The user accesses the web-application.
Step 2	The user begins to search for zones and the starting point is automatically filtered based on specific search criteria such as disease (e.g. avian influenza), type of zone (e.g. infected), etc.
Step 3	The user progressively adjusts their search criteria to further refine the filtered results.
Step 4	The user selects a zone.
Step 5	The web-application displays a map zoomed in on the selected zone.
Step 6	The user can view the zone data, including information such as zone ID, type of zone, date when the zone was implemented and details about the control/prevention activities and/or regulatory responses implemented in the zone, etc.

Establish a new zone

2.1: User story.

The Italian National legislation has established an infected zone for Avian Influenza (AI) by the Italian staff of NVS/VMO. A GIS expert is able to define the zone's geospatial data, such as polygon that represent the extent of the zone, the period of validity for the zone and the measures implemented within the zone through the use of their own GIS application. The GIS expert transmits the zone geospatial data to the web-application. Subsequently, the web-application integrates the received geospatial data into its own database to publish the acquired information.

2.2: UML use case diagram.



2.3: Use case description table.

ID: 2	
Name	Establish a new zone
Actor	<ul style="list-style-type: none"> - GIS expert: Primary actor - Staff of NVS/VMO - Web-application
Goal	To publish the established zone into GeoZone.
Level	User
Description	<p>An Italian GIS expert intends to publish in the web-application the newly established AI infected zone. The expert gathers the necessary information, draws the polygon(s) that represent the zone extent, associates the zone's attributes, and stores the geospatial data into the local geospatial dataset. The GIS expert converts the local zone's geospatial data into the GeoZone data schema and subsequently transmits the transformed geospatial data to the web-application. The web-application receives the incoming geospatial data and publishes the updated zone geospatial data.</p>
Pre-condition	<ul style="list-style-type: none"> - A local level protocol is established to define and store the zone geospatial data; - A protocol is established to transform the local geospatial data into the GeoZone data schema - A protocol is established to transfer the zone's geospatial data to the web-application; - The web-application has implemented functions and protocols to acquire, integrate and publish the incoming zone geospatial data.
Post-condition	The web-application displays the newly established AI zone. .
Relationship with other use cases	<ul style="list-style-type: none"> - Transmit zone's data to the web-application; - Publish zone's data by means of the web-application.
Flow of Events – Successful scenario	
Step 1	The GIS expert acquires the necessary information to define the zone geospatial data.
Step 2	The GIS expert, utilizes GIS software and following the established protocol, draws the polygon(s) that represent the zone and stores the associated attributes in the designed platform.
Step 3	The GIS expert, following the defined protocol, generates a set of information that is transferred to the web-application.

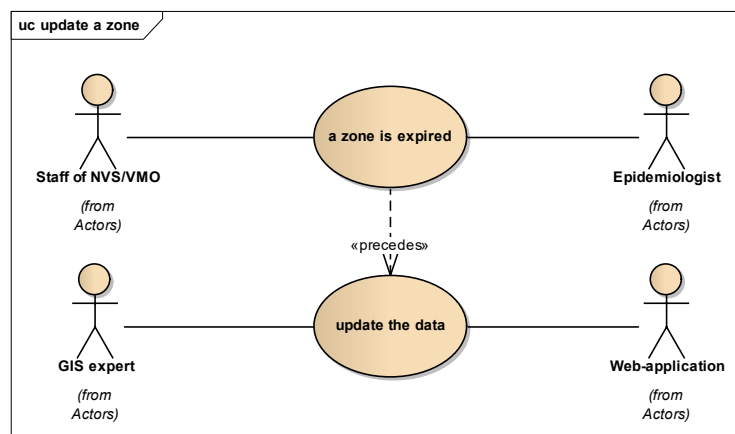
Step 4	The web-application receives the incoming information and initiates functions and tasks to integrate and publish the acquired data.
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Update zone's data

3.1: User story.

The Italian AI infected zone has expired, prompting the GIS expert to update for this information in the web-application. Using the functionalities provided by the web-application, the GIS expert locates the relevant zone and updates its validity period with the expired date.

3.2: UML use case diagram.



3.3: Use case description table.

ID: 3	
Name	Update a zone
Actor	GIS expert: Primary actor Staff of NVS/VMO Web-application
Goal	To update the expired date of a zone already present in the web-application.
Level	Functional
Description	An Italian GIS expert aims to update the “expired date” of a zone that is already stored in the GeoZone geospatial dataset. The expert utilizes the web-application to locate the specific zone and make the necessary update to the expired date. Subsequently, the web-application publishes the updated zone status.
Pre-condition	<ul style="list-style-type: none"> - The zone that requires updating is already present in the database of the web-application; - The web-application has implemented functions and protocols to search for and update zone data.
Post-condition	The web-application visually represents the updated status of the AI zone using the “expired” portrayal theme.
Relationship with other use cases	None

Flow of Events – Successful scenario	
Step 1	The GIS expert receives the required information to update the zone’s geospatial data.
Step 2	The GIS expert, utilizes the web-application to search for the zone.
Step 3	The GIS expert updates the expiration date value of the zone.
Step 4	The web-application publishes the updated zone’s status.

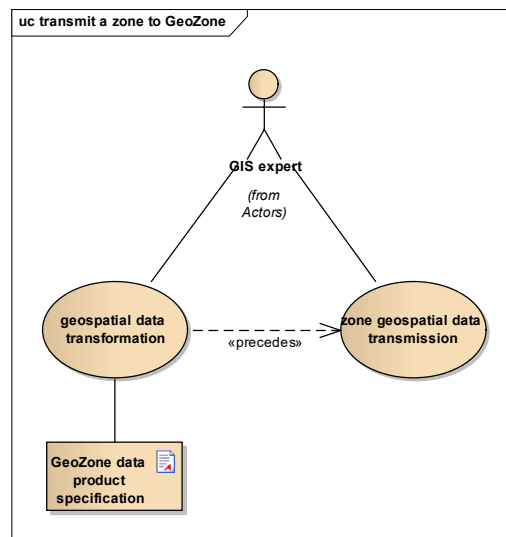
This use case assumes that the web-application has a functionality that enables the updating of the zone’s data.

Upload zone’s data to the web-application

4.1: User story.

The GIS expert is responsible for transmitting the updated zone’s geospatial data to the web-application. Following a defined protocol, the GIS expert converts the local zone’s geospatial data into the GeoZone data schema and generates the necessary set of information as per the protocol. The set of information is then transmitted to the web-application.

4.2: UML use case diagram.



4.3: Use case description table.

ID:	4
Name	Transmit a zone to GeoZone
Actor	GIS expert: Primary actor
Goal	To transmit a zone to web-application
Level	Functional
Description	Protocol set up by a GIS expert to transmit zone geospatial data to the web-application.
Pre-condition	- The zone geospatial data are stored in the local work area of the GIS expert;

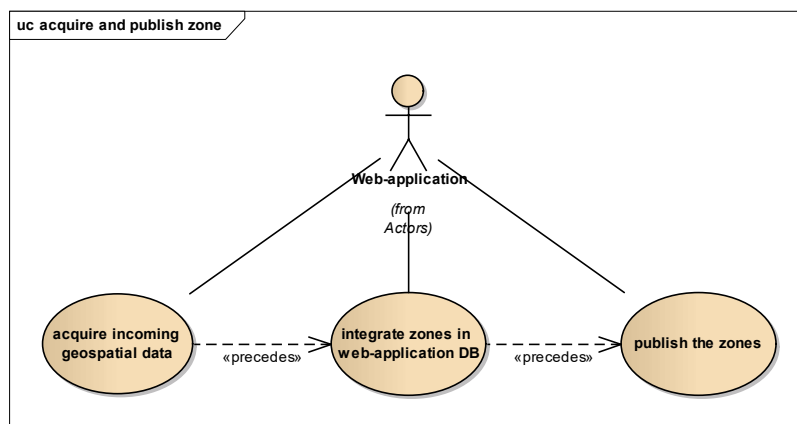
	<ul style="list-style-type: none"> - A local level protocol is established to transform the geospatial data stored in the local work area into the GeoZone data product schema; - A protocol is established to transmit the transformed zone geospatial data to the web-application.
Post-condition	The web-application acknowledges that the transmitted data have been successfully acquired.
Relationship with other use cases	Establish a new zone
Flow of Events – Successful scenario	
Step 1	The GIS expert follows the protocol to generate the set of information as defined by the GeoZone data product specification.
Step 2	The GIS expert transmits the set of information to the web-application.
Step 3	The web-application successfully receives the set of information.

Publish zone’s data by means of the web-application

5.1: User story.

The web-application system acquires the incoming information and subsequently initiates the process to verify, integrate and publish the received data.

5.2: UML use case diagram.



5.3: Use case description table.

ID:	5
Name	Publish zone’s data
Actor	Web-application: Primary actor
Goal	Publish zones using the web-application.
Level	Functional
Description	Process to acquire and publish zone geospatial data.
Pre-condition	A protocol is established to acquire, verify, integrate and publish zone geospatial data.

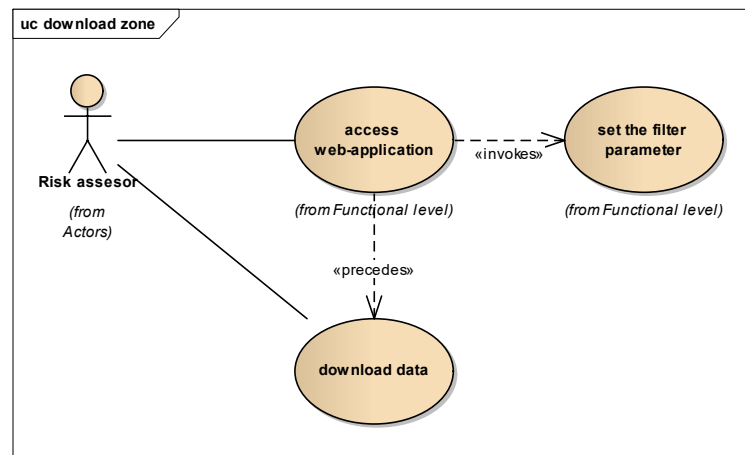
Post-condition	The web-application successfully publishes the zone geospatial data.
Relationship with other use cases	Transmit a zone to the web-application.
Flow of Events	Successful scenario – acquire and publish geospatial data of a new zone
Step 1	The web-application receives a set of geospatial data.
Step 2	The web-application verifies the data compliance with the GeoZone data schema.
Step 3	The web-application verifies the quality of the received data.
Step 4	The web-application successfully stores the received data in its database.

Download zone’s data

6.1: User story.

As a risk analyst, your goal is to incorporate information regarding the presence of AI infected zones into your standalone application. You require the functionality to list and search for zones based on textual specification such as Member, disease, as well as geographic search criteria. Additionally, you want the ability to progressively narrow down your search by incrementally adding more criteria clauses. You would like to have the ability to select specific zones and download the chosen selection in the standalone application. You expect clear communication of any terms & conditions (T&C) associated with the use of the zone’s data in your standalone application. It is important to provide you with the opportunity to review and accept the T&C before proceeding with the download of the data.

6.2: UML use case diagram.



6.3: Use case description table.

To streamline description, certain steps of the use-case are not reproduced here – instead, the case “user discovers and visualises zones” should be referenced, considering the deployment of the web-application access, parameter setting and visualization of zones through maps and attribute information.

ID:	6
Name	Download zone’s data
Actor	Risk analyst: Primary actor

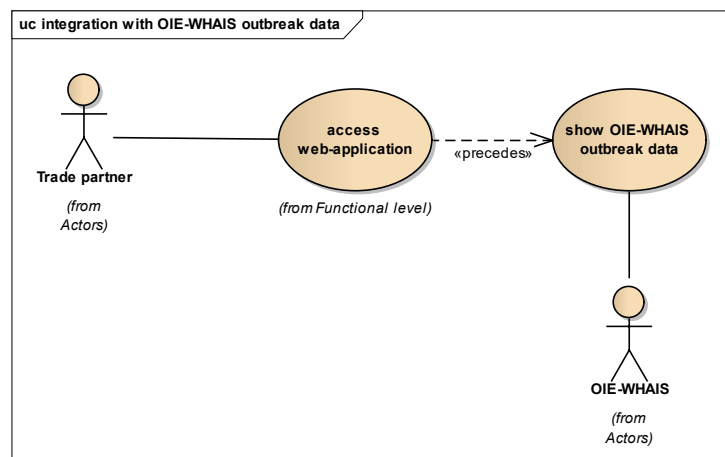
Goal	To download zones using the web-application.
Level	Behavioural
Description	Process to choose and download zone geospatial data.
Pre-condition	The web-application includes functionality that enables the selection of one or more zones.
Post-condition	The web-application has made the zone geospatial data available for download.
Relationship with other use cases	The user discovers and visualises zones.
Flow of Events – Successful scenario – The risk analyst selects and downloads zone’s geospatial data	
Step 1	The risk analyst initiates the search for zones by utilizing the available section tools.
Step 2	The risk analyst needs to download the data.
Step 3	The risk analyst reviews the T&Cs associated to the selected data and proceeds to accept the terms.
Step 4	The risk analyst downloads the file prepared by the web-application.

Integration with WOAH-WAHIS outbreak data

7.1: User story.

As an Italian trade partner, I’m interested in obtaining current information about the AI disease situation/status in Italy. Therefore, I would like to visualize the AI infected zones in Italy on a map, along with the Italian AI outbreaks stored in WOAH-WAHIS.

7.2: UML use case diagram.



7.3: Use case description table.

To streamline the description, certain steps of the use-case are not reproduced here – instead, the case “user discovers and visualises zones” should be referenced, considering the deployment of the web-application access, parameter setting and visualization of zones through maps and attribute information.

ID: 7

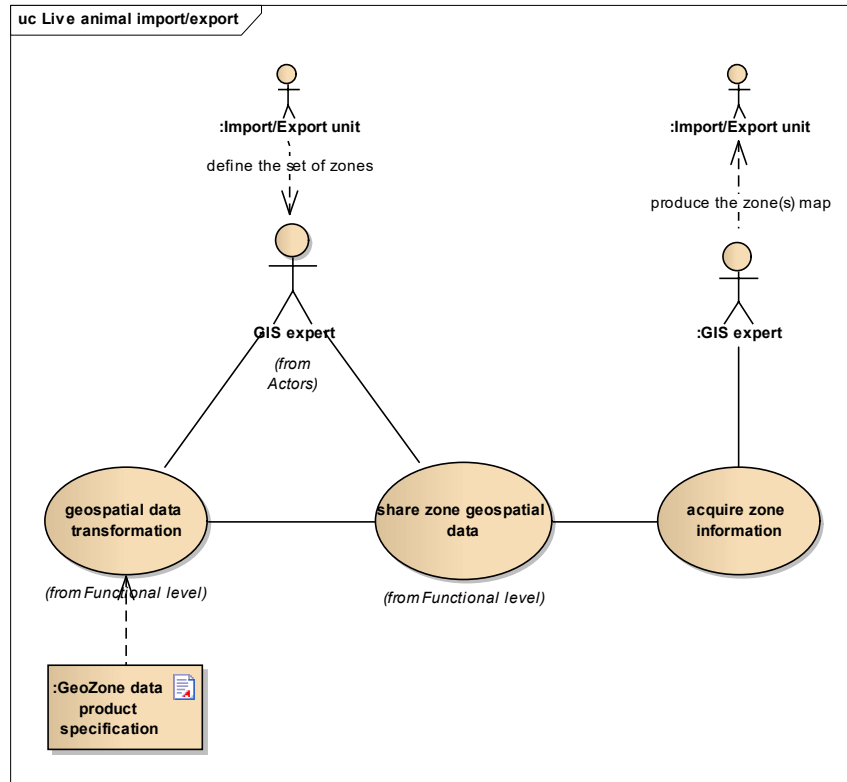
Name	integration with WOA-H-WAHIS outbreak data
Actor	Trade partner: Primary actor
Goal	To visualize in the web-application the information about zones, along with the outbreak information provided by WOA-H-WAHIS.
Level	behavioural
Description	Process to involve incorporating information about the outbreaks into the zone map.
Pre-condition	WOAH-WAHIS offers a web service that publishes information about active outbreaks for a specific disease and Member. WOAH-WAHIS has provided updated information regarding outbreaks that are included in the GeoZone data.
Post-condition	WOAH-WAHIS data is displayed in the web-application.
Relationship with other use cases	The user discovers and visualises zones.
Flow of Events – Successful scenario – WOA-H-WAHIS outbreak data is displayed on the map	
Step 1	The trade partner begins to search for disease, type of zone (such as infected), and Member utilizing the available filter tools.
Step 2	The trade partner activates the WOA-H-WAHIS outbreak layer in the table of contents window.
Step 3	The web-application retrieves the WOA-H-WAHIS outbreak features through web services (e.g. WMS, WFS), filtered based on the parameters defined by the trade partner.
Step 4	The web-application visualizes the filtered zones and the corresponding outbreak features obtained from WOA-H-WAHIS, presenting them together on the map. Optionally, the trade partner is provided with the opportunity to view the outbreak information from WOA-H-WAHIS, including details such as status, animal category and total cases.

Live Animal Import/ Export

8.1: User story.

As Live Animal Import/ Export Unit I'm interested in verifying the proximity of a shipment's origin to a zone/ region under HPAI movement restrictions. This would not require premises within the affected area to be identified by name or exact location and could allow for customization of the zone/ region surveyed based on animal movement (trade) agreements.

8.2: UML use case diagram.



8.3: Use case description table.

ID: 8	
Name	Share zone geospatial data with a trade partner
Actor	Import/export unit: Primary actor
Goal	To acquire zone(s) geospatial data in order to evaluate the zone spatial distribution in a trade partner's territory.
Level	User level
Description	Process to acquire zone maps to be integrated in the animal import/export dossier
Pre-condition	The exporter partner has some zone geospatial data to share with a trade partner. The importer partner needs zone geospatial data to fulfil its trade dossier.
Post-condition	The importer unit has the zone maps.
Relationship with other use cases	Geospatial transformation.
Flow of Events – Successful scenario – the importer trade unit has zone(s) displayed on the map	
Step 1	The exporter trade unit begins to set the list of zone to share with the trade partner.
Step 2	The exporter trade partner produces the zone(s) dataset and shares the dataset with the trade partner.
Step 3	The importer trade partner acquires the zone geospatial data.
Step 4	The imported GIS expert produces the zone maps according to the Import/export unit needs.